

# **The Mechanical Design of High Precision Positioning Instruments Used for X-ray Microscopy at the ESRF**

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## **Abstract**

The ESRF has built for six years, microscopy beamlines, on which various instruments like high precision sample scanners, micro-beamstop, zone-plate positioners, and Kirkpatrick-Baez optics have been developed. This design area covers vibrational stability, high level of reproducibility, micro-stiffness, compactness, and no lever arm. Thus, samples are exposed to X-ray beam spot sizes between 0.1  $\mu\text{m}$  to 0.5  $\mu\text{m}$ , which requires less than 50 nm vibration peak to peak, and step size in “zap-scan” mode less than 100nm.

According to the required accuracy, stiffness is a permanent improvement concern. Pico-motors against micro-jacks are alternative solutions, which imply from the instruments, a rather high degree of evolution.

This presentation should review the instruments design for ID21, ID22, Kirkpatrick-Baez optic, and other existing solutions, when micro-focus is required for some other ESRF beamlines.

**Keywords:** micropositioning, microscopy, high precision

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